

Oil and the American Way of Life: Don't Ask, Don't Tell

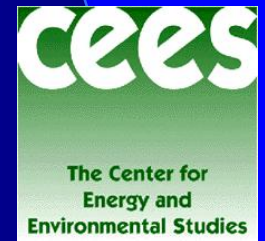
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Southern California Association of Governments

October 5, 2006



<http://www.bu.edu/cees/people/faculty/kaufmann/index.html>



Basic Facts of the Oil Market 2005

World oil demand 83.6 million barrels per day

OPEC produces 42 percent of the world market

US Consumed 20.7 million barrels per day

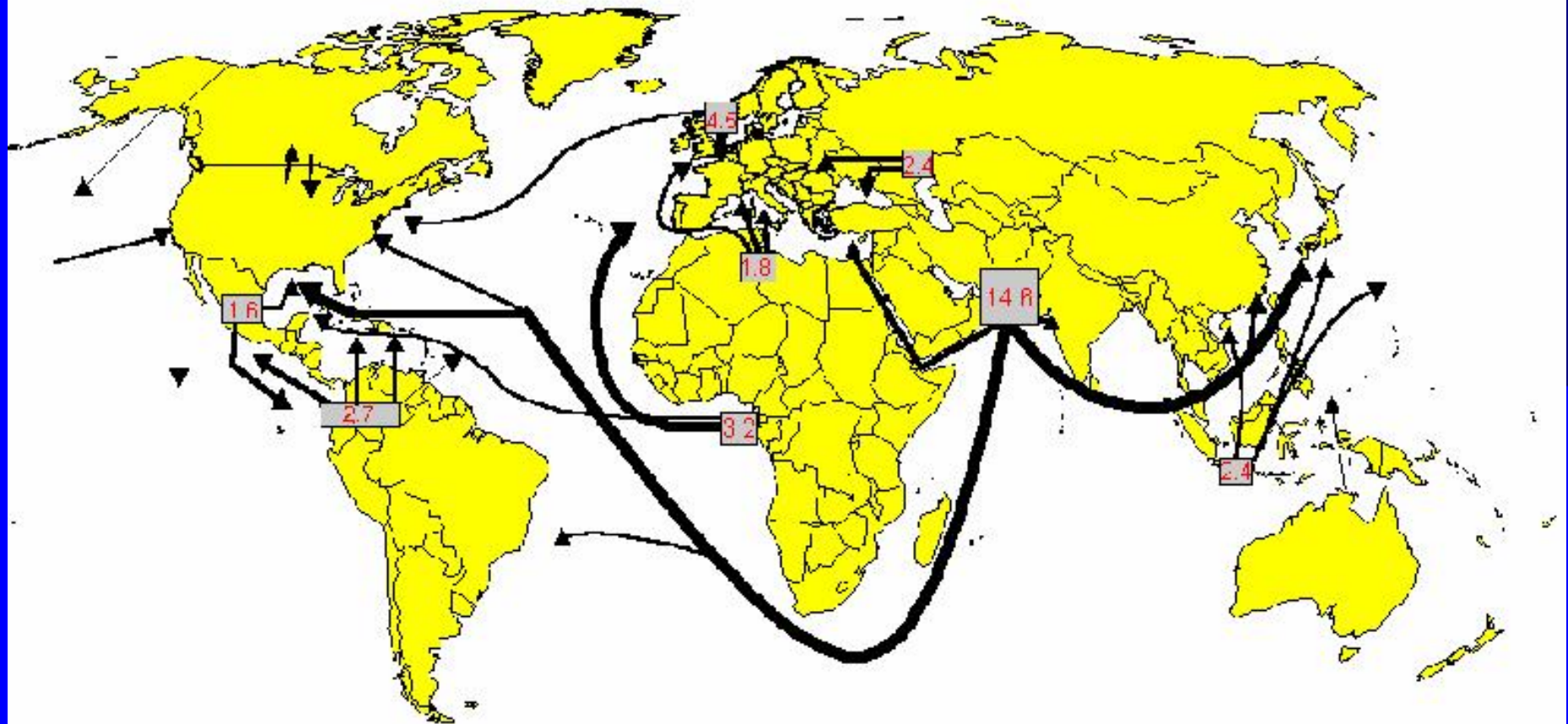
US imports 65 percent of its consumption

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Does The Source of US
Oil Imports Matter?

World Crude Oil Flows 1997

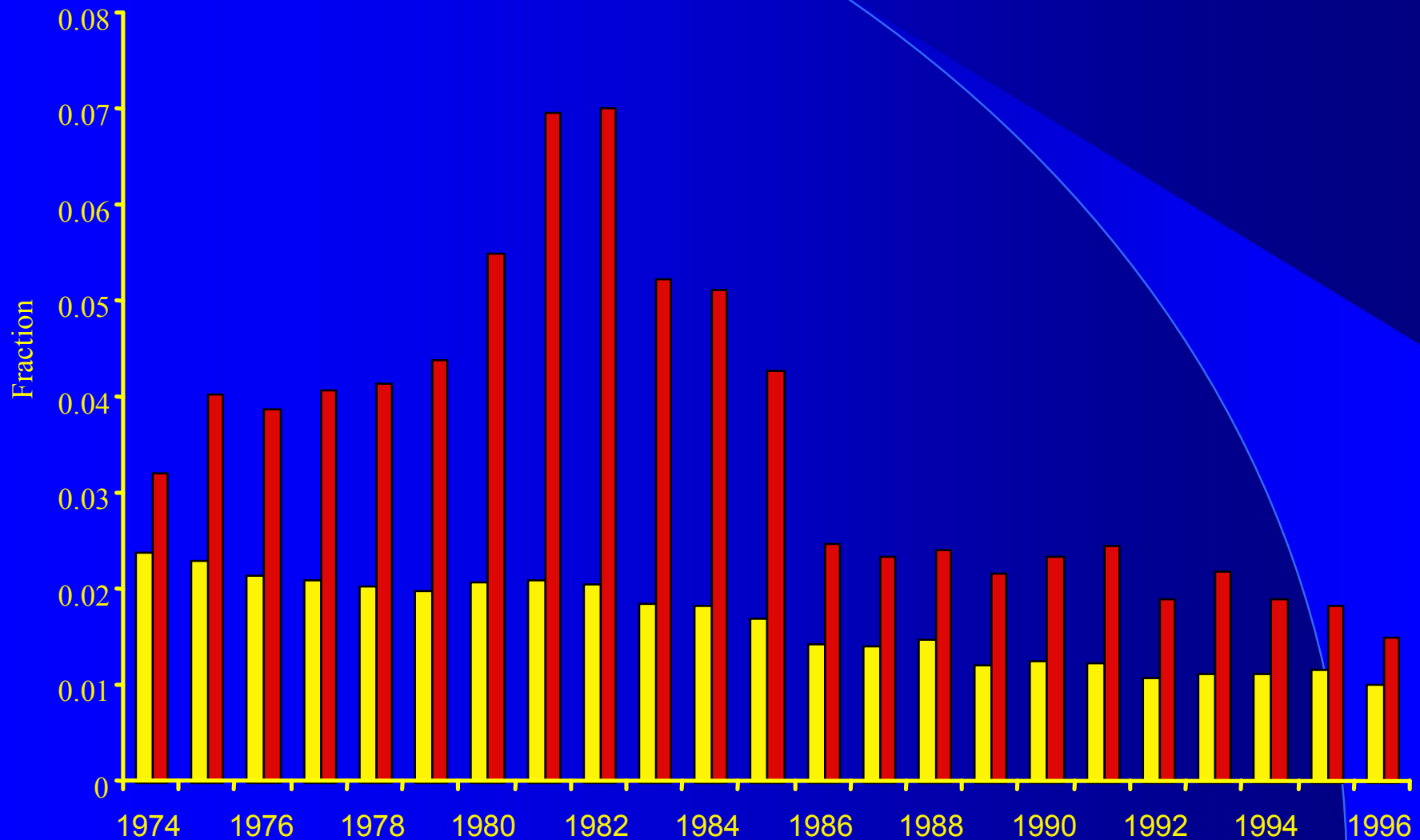
34.8 Million Barrels Per Day



Energy Information Administration

Reducing US Dependence on
Imported Oil is a “Good Thing”

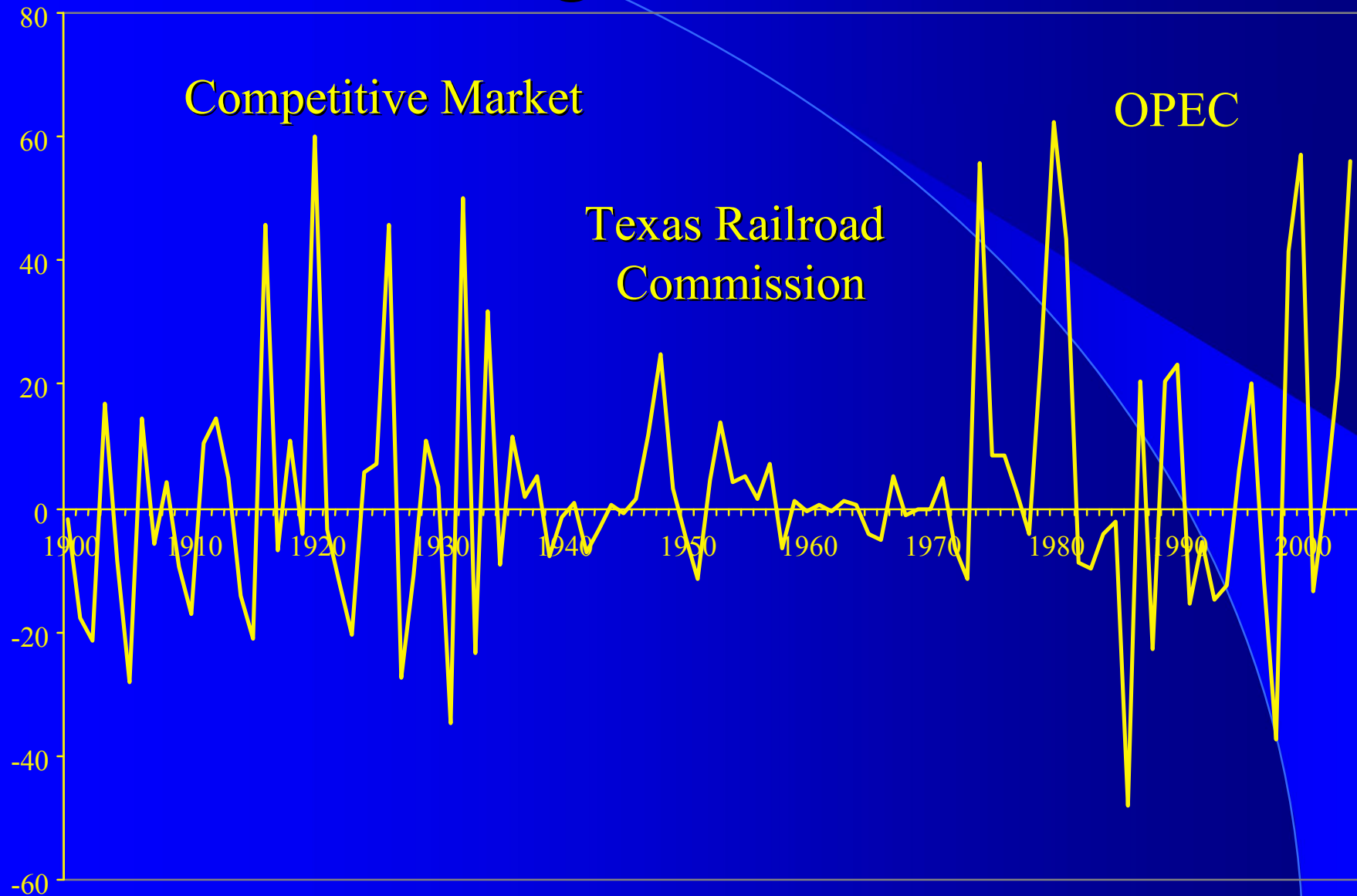
The Costs of Increasing US Production



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A Competitive Market Prices Oil Efficiently

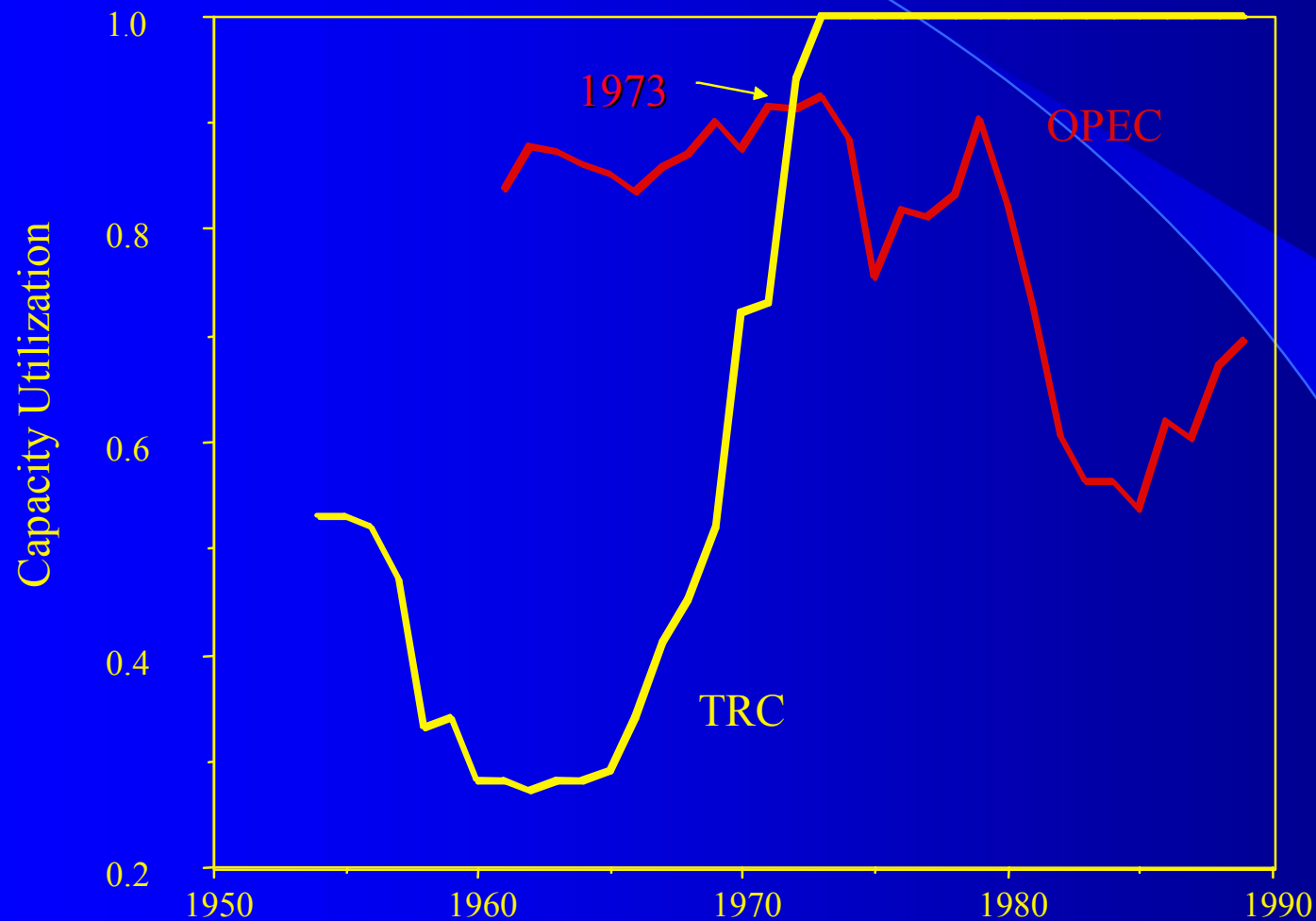
Annual Change in Real Oil Prices



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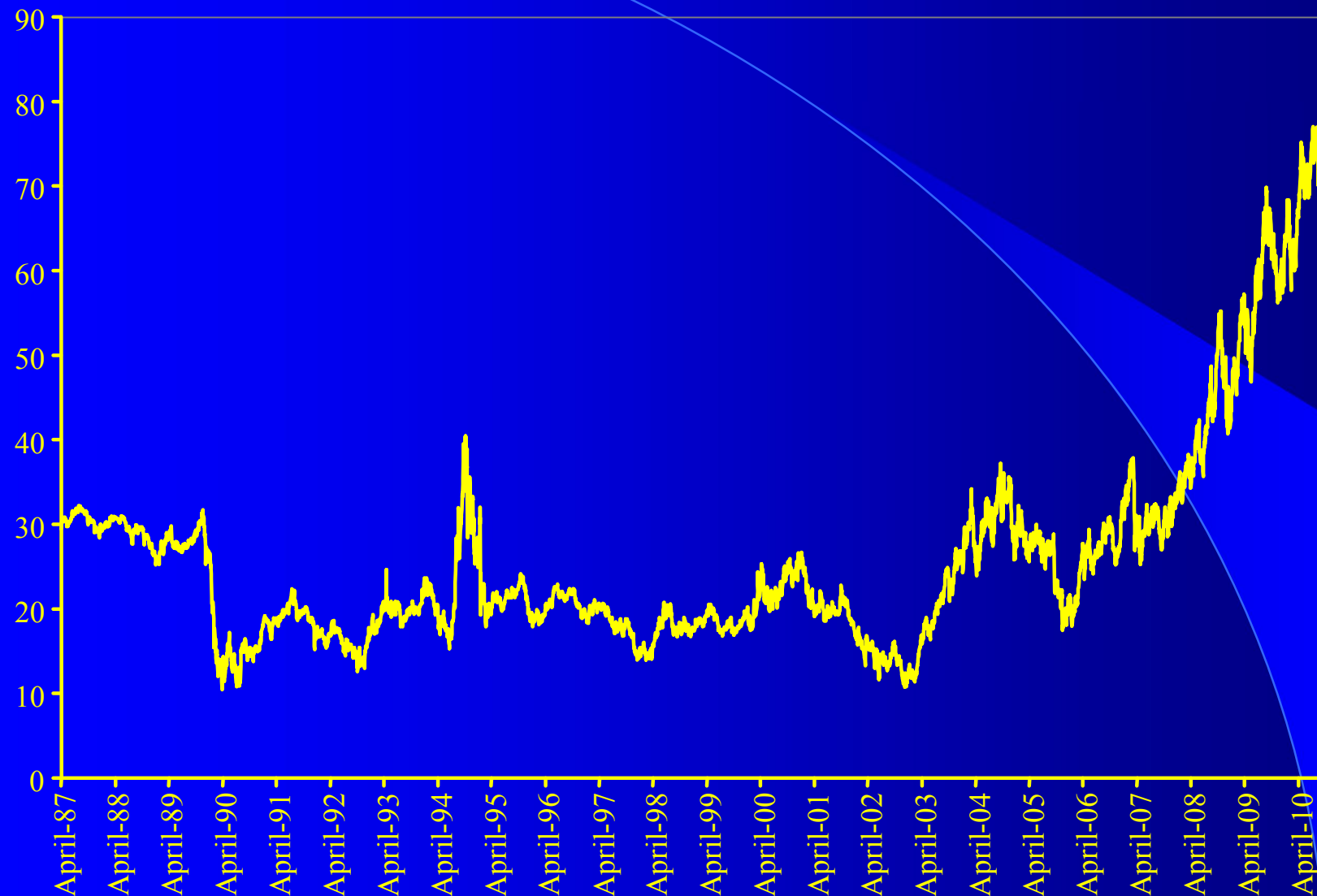
Does OPEC Matter?

OPEC Controls Marginal Supply



Kaufmann, R.K. 1995. A model of the world oil market for Project LINK *Economic Modelling* 12:165-178

Where Are Prices Now?



The Determinants of World Oil Prices

OPEC Capacity Utilization OPEC production
divided by OPEC Capacity

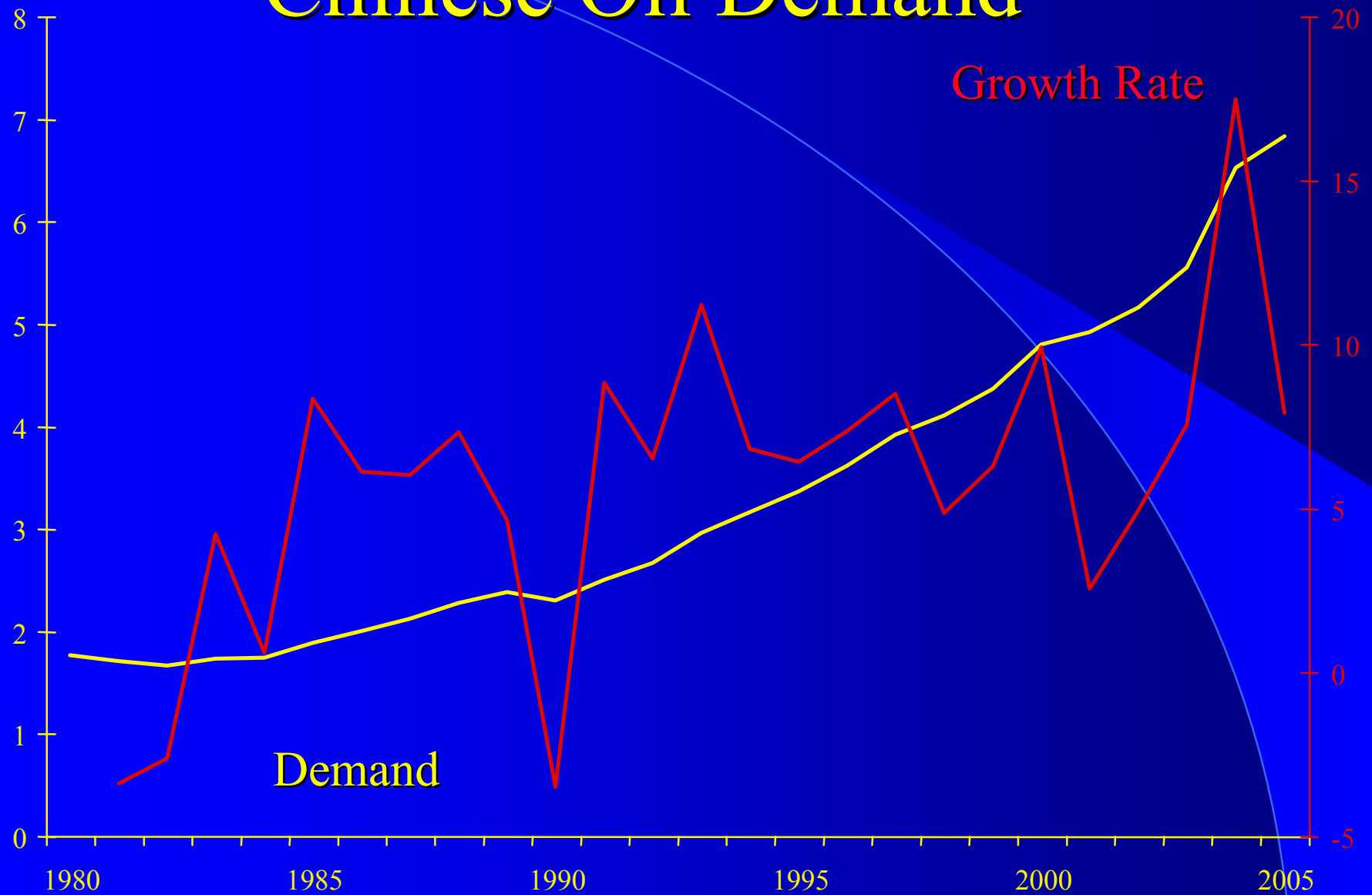
OPEC Capacity Utilization



OPEC Capacity



Chinese Oil Demand

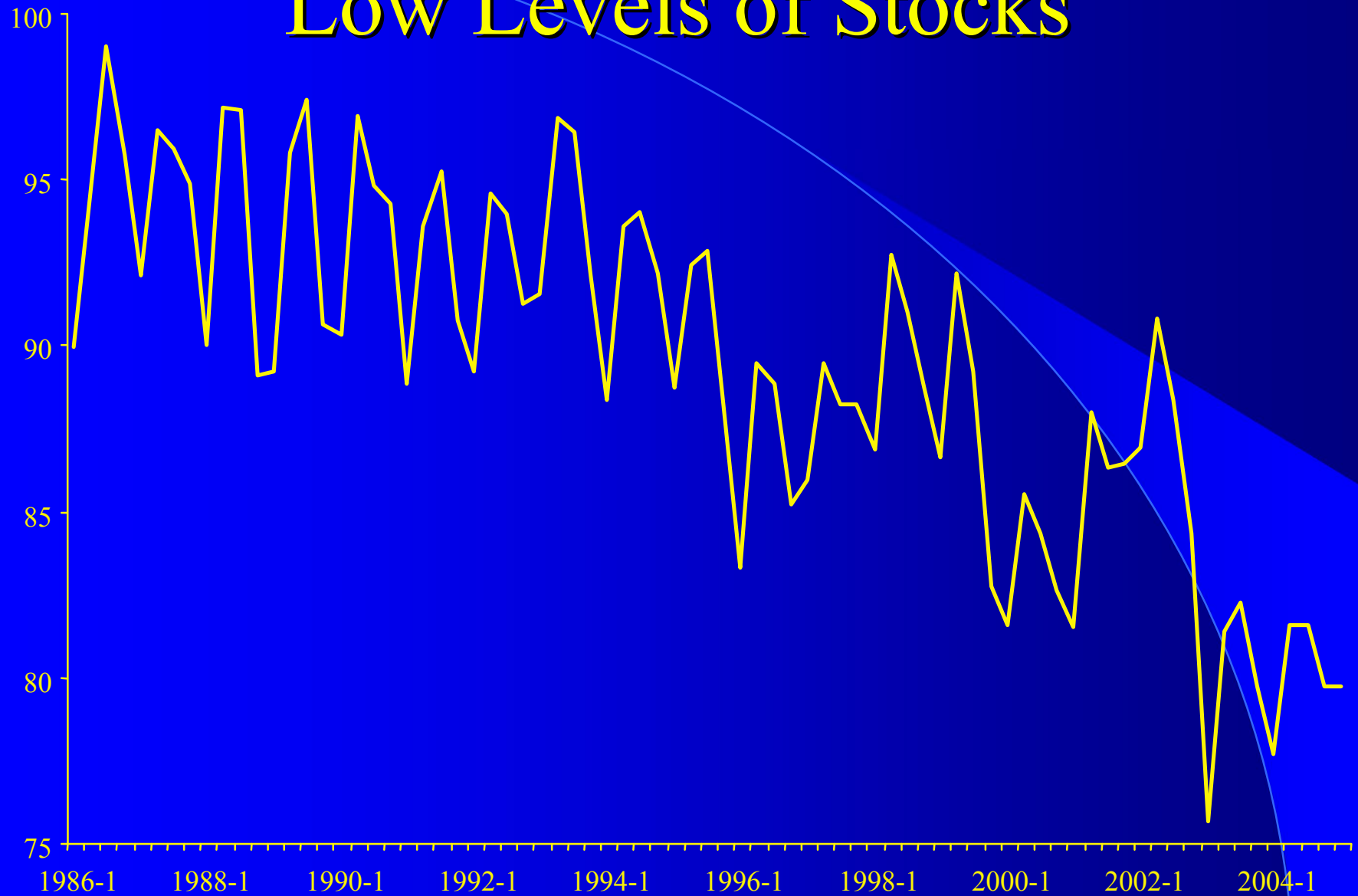


The Determinants of World Oil Prices

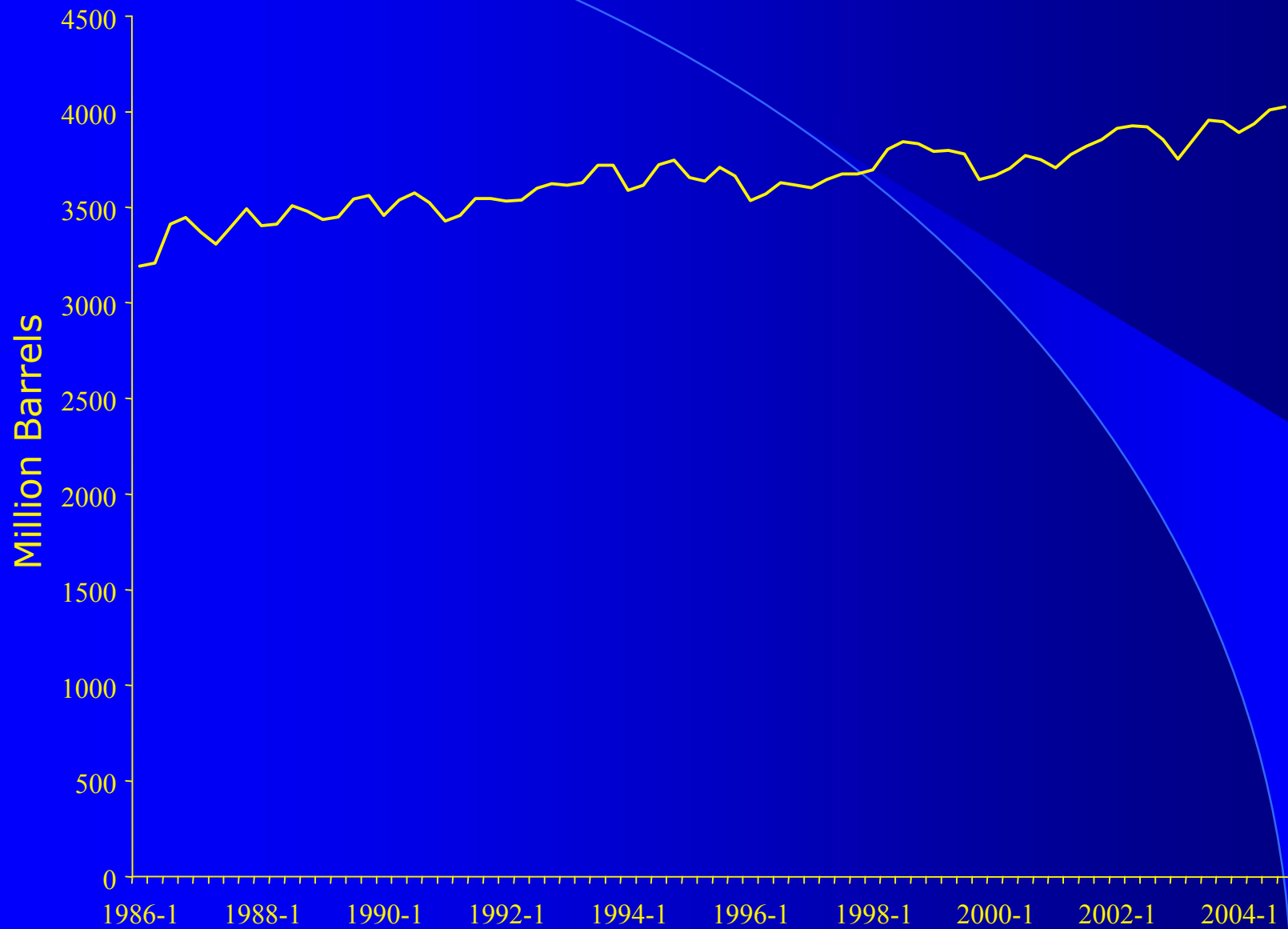
OPEC Capacity Utilization OPEC production
divided by OPEC Capacity

OECD Stocks Days of forward consumption

Low Levels of Stocks



OECD Stocks



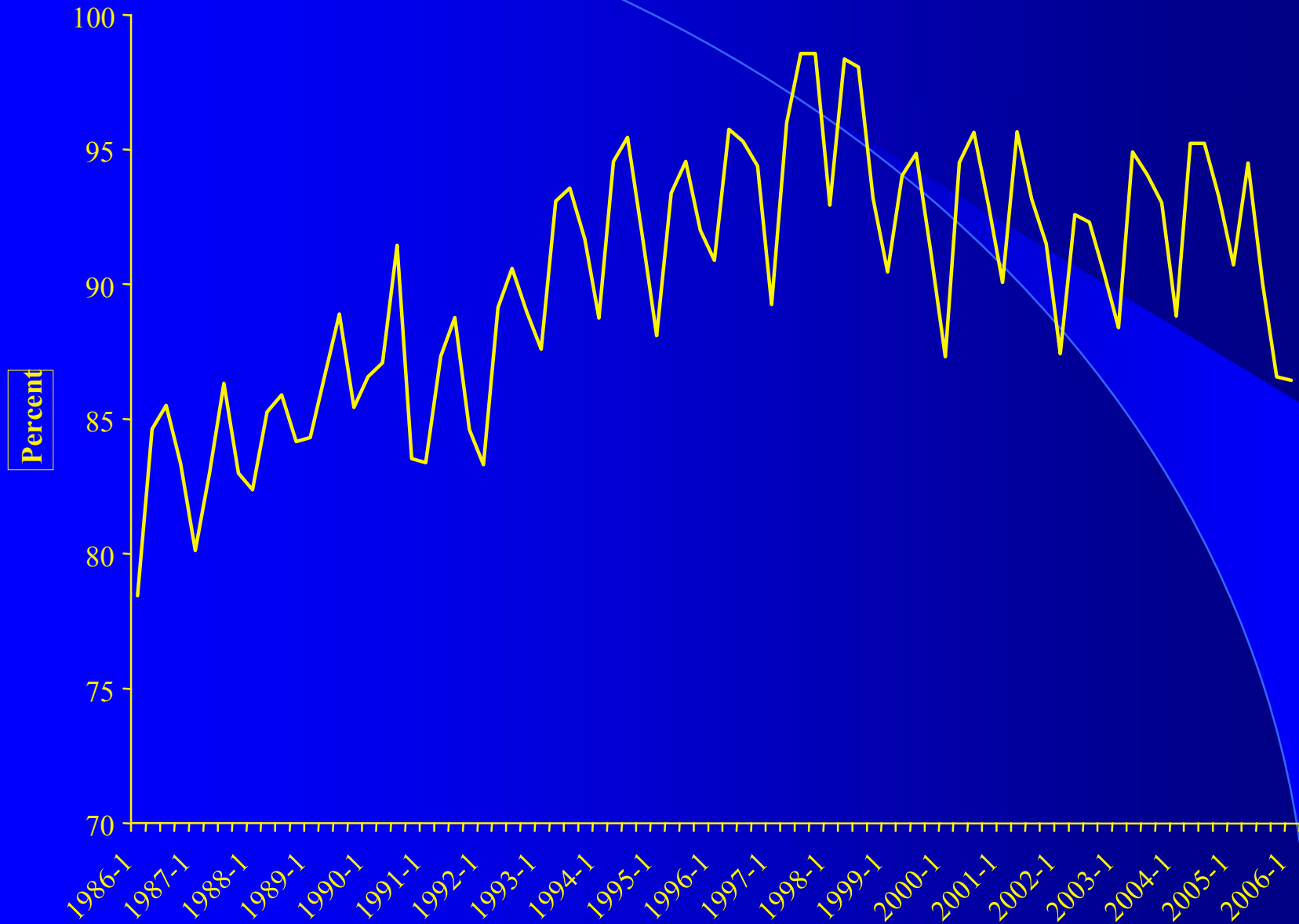
The Determinants of World Oil Prices

OPEC Capacity Utilization $\frac{\text{OPEC production}}{\text{OPEC Capacity}}$

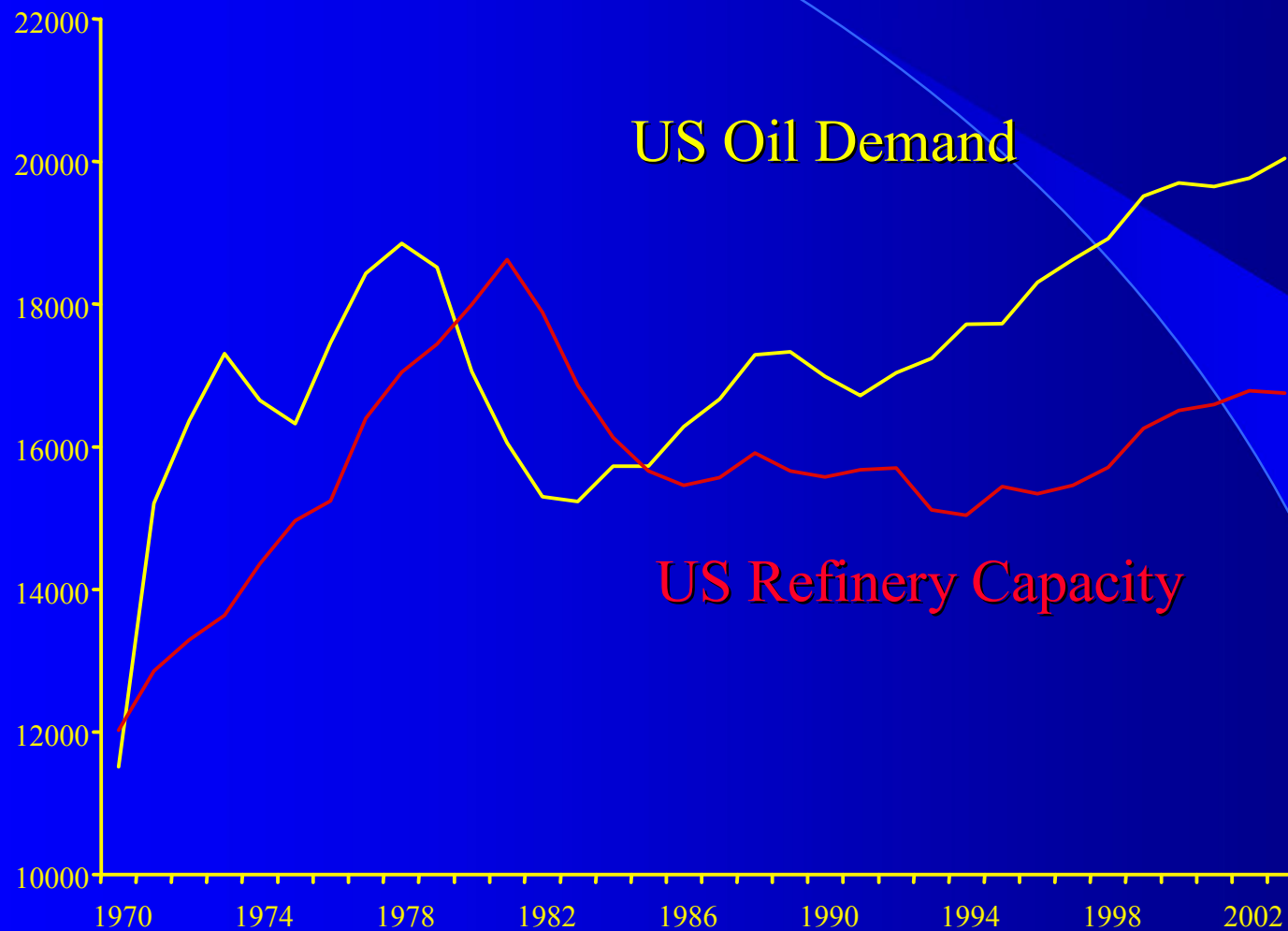
OECD Stocks Days of forward consumption

Refinery Utilization Percentage

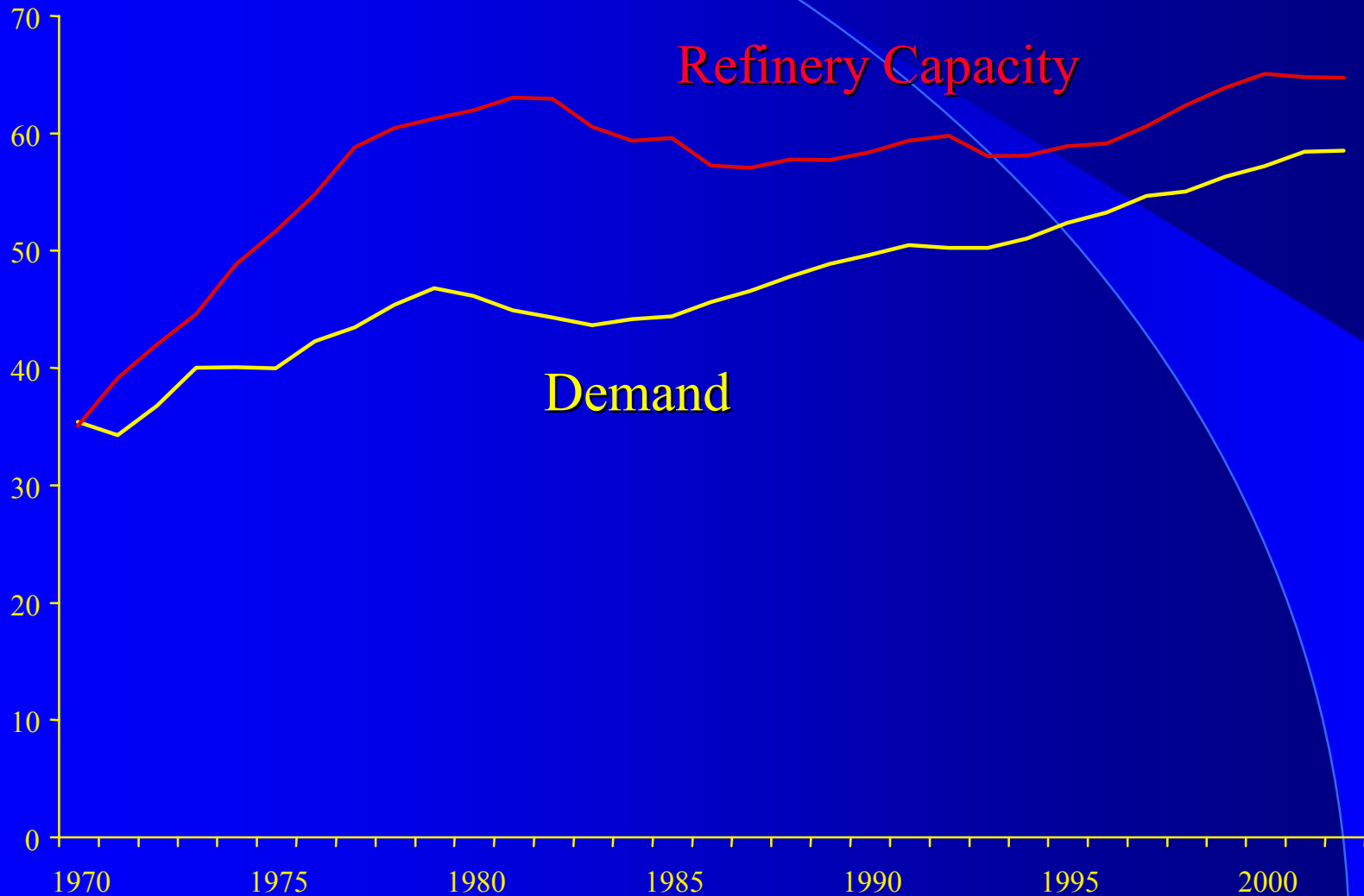
US Refinery Utilization



US Refinery Capacity



Non-US Refinery Capacity & Demand



The Determinants of World Oil Prices

OPEC Capacity Utilization OPEC production
divided by OPEC Capacity

OECD Stocks Days of forward consumption

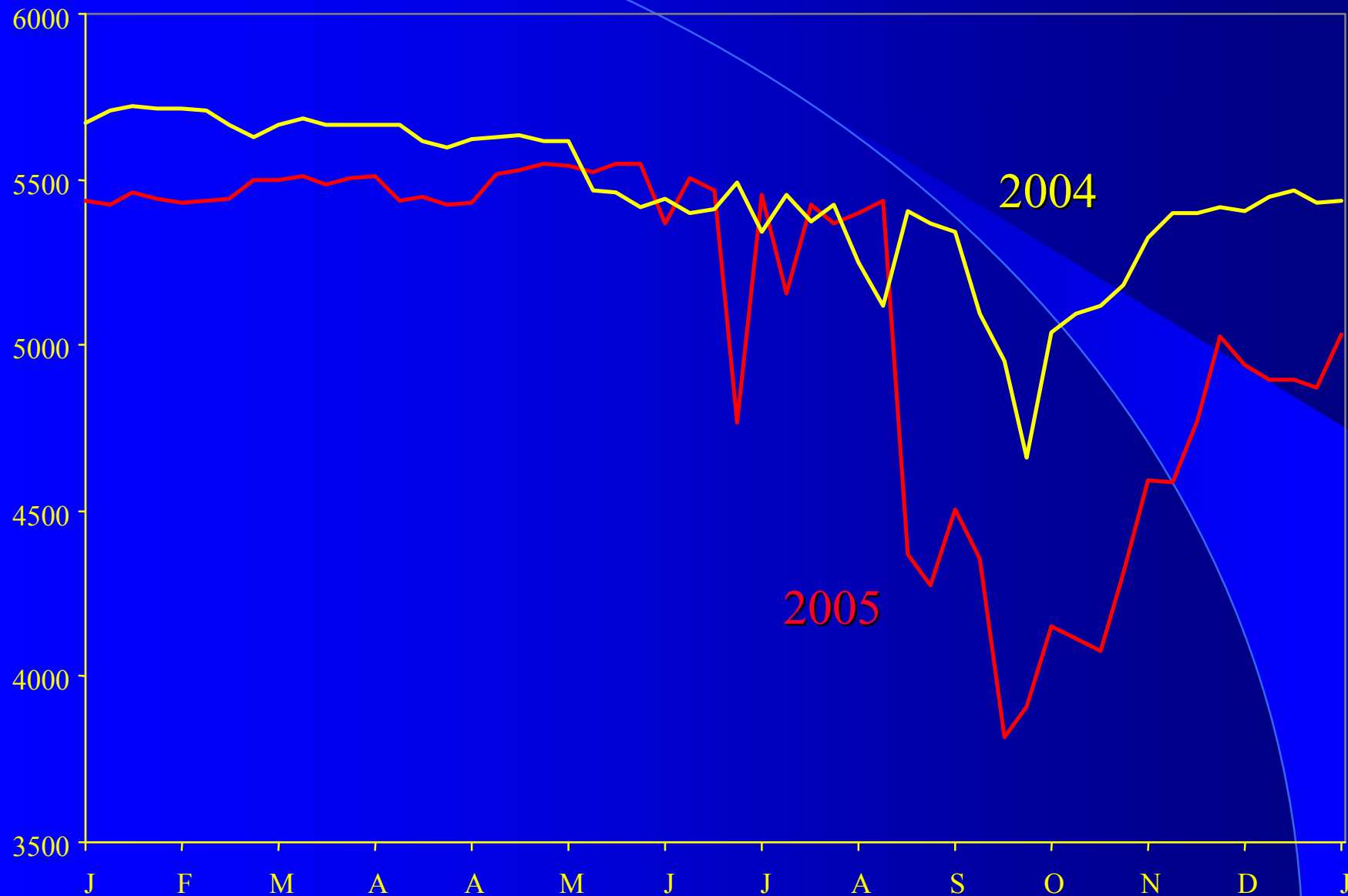
Refinery Utilization Percentage

OPEC Quotas Levels of production agreed on at
OPEC meetings

Cheating Production beyond quotas

Temporary Disruptions: Hurricane Season

US Crude Oil Production



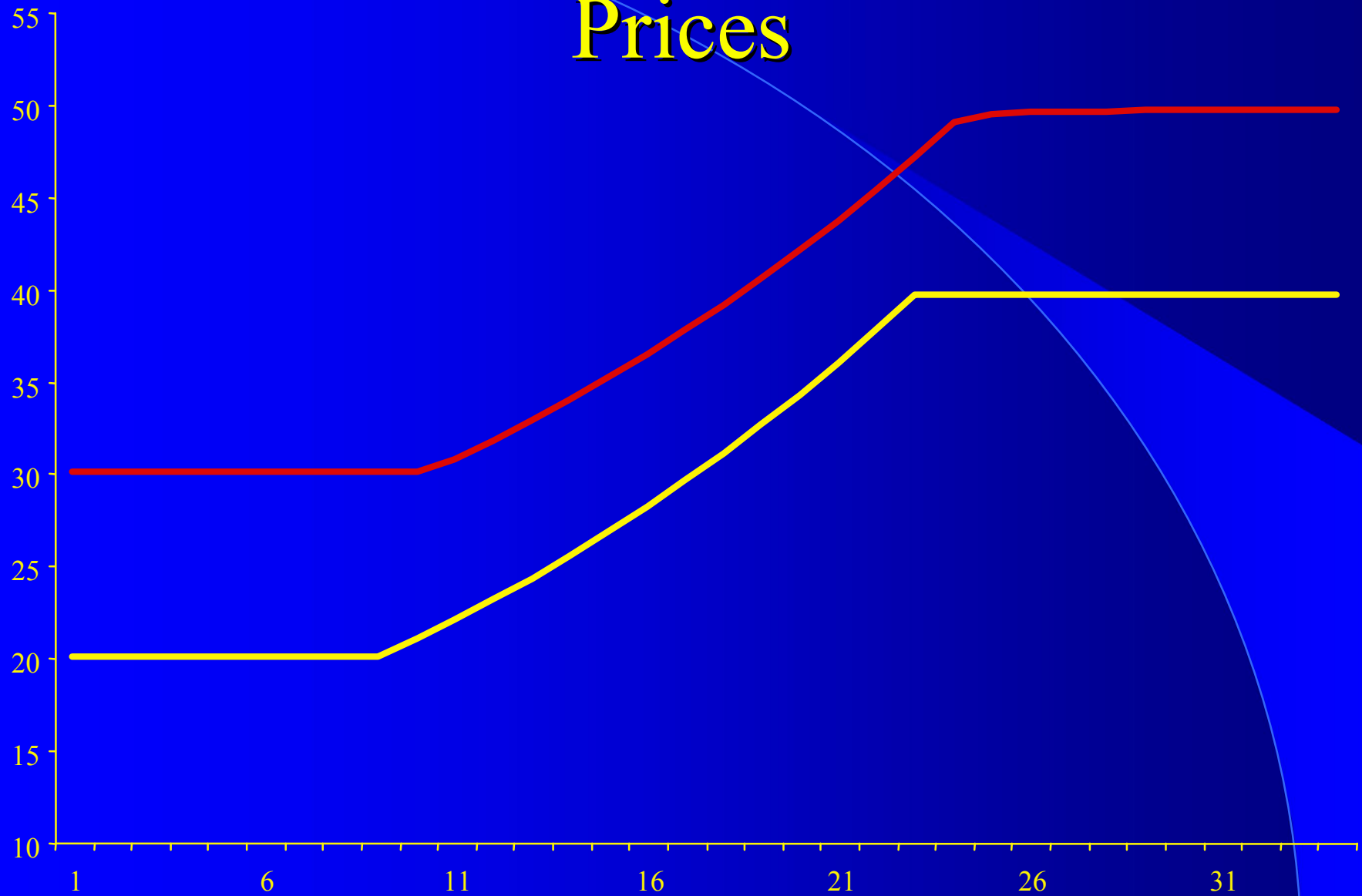
US Refinery Throughputs



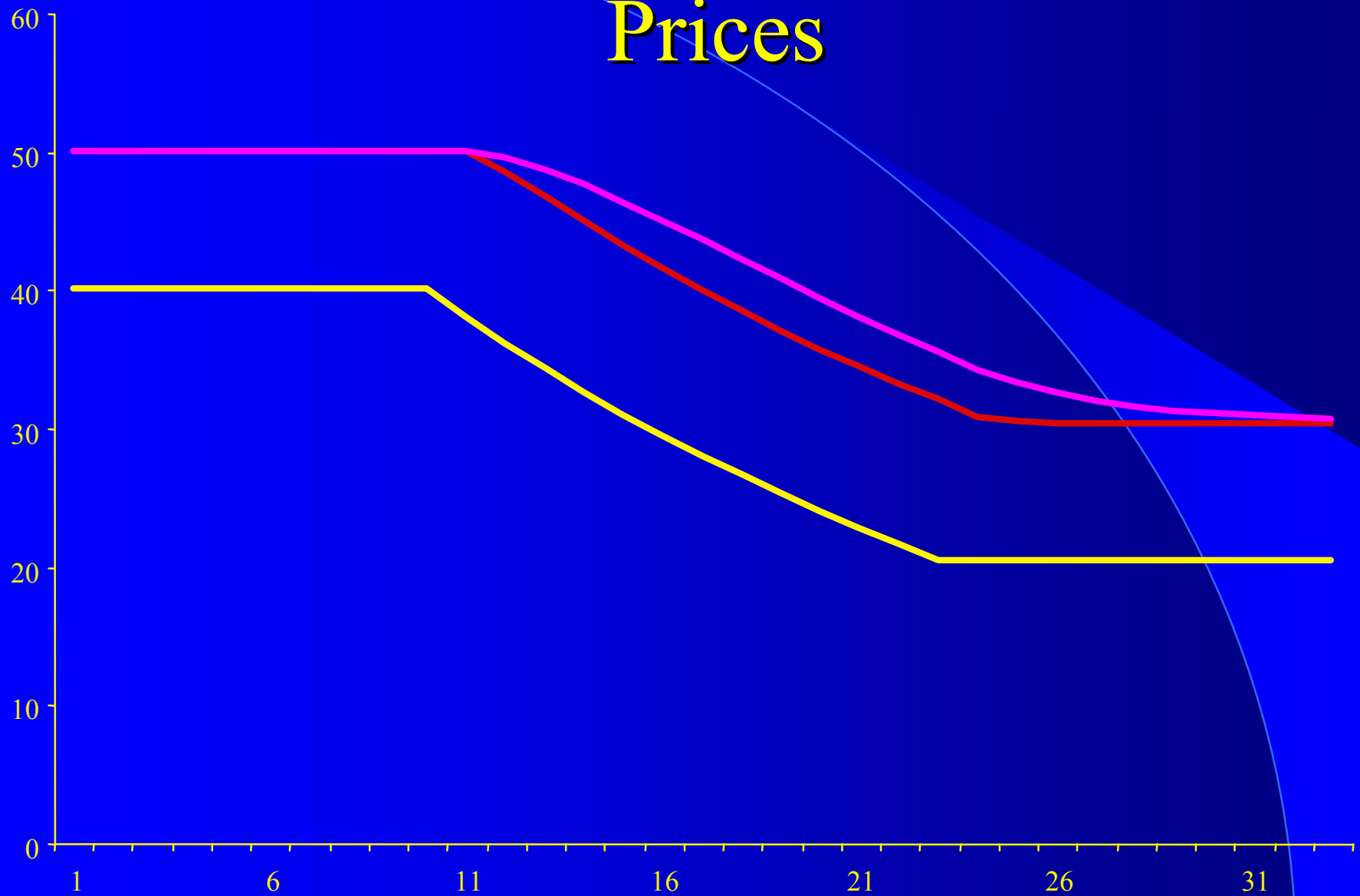
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Do Gasoline Prices Rise
Faster Than They Fall?

Rising Crude Oil & Motor Gasoline Prices



Falling Crude Oil & Motor Gasoline Prices



Yes...But

Gasoline price rise faster than they fall in: Texas, Michigan, Pennsylvania, Florida, Illinois, Minnesota, Ohio, Louisiana, Idaho (not Washington)

Effect caused by stocks and refinery utilization

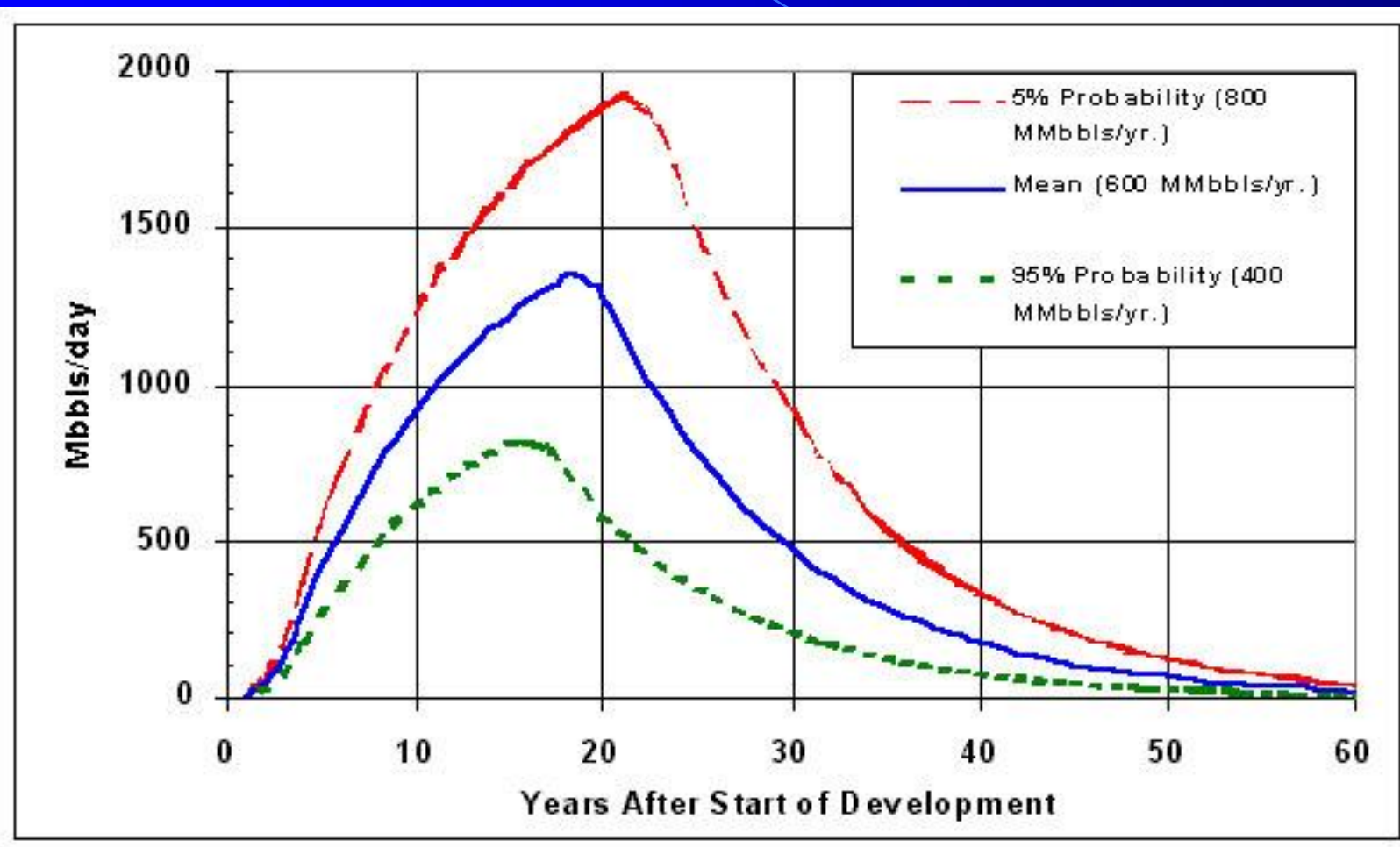
As demand declines, producers slow refining and sell from stocks, which slows the price drop

As demand rises, refinery capacity limits supply response

Will Opening ANWR Or Large Discoveries Solve US Supply Constraints?



USGS Projections For ANWR



United States Geological Survey, 1999. The oil and gas resource potential of the Arctic National Wildlife Refuge 1002 Area, Alaska, Open File Report 98-34.

The Story Behind the Headlines



Remaining Supplies of Oil

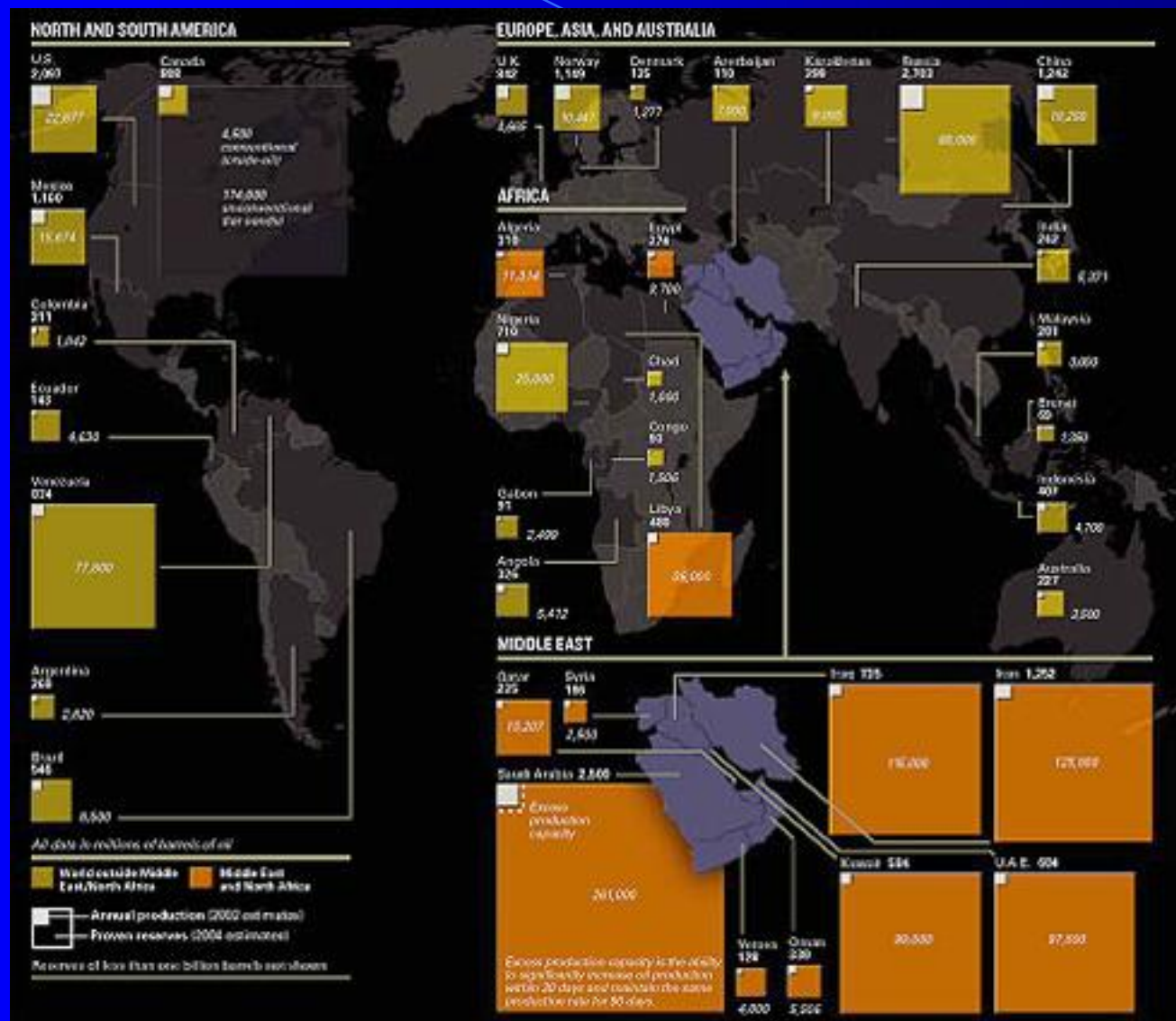


Figure From The End of Cheap Oil National Geographic 2004

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Will OPEC Be Willing to
Increase Production?

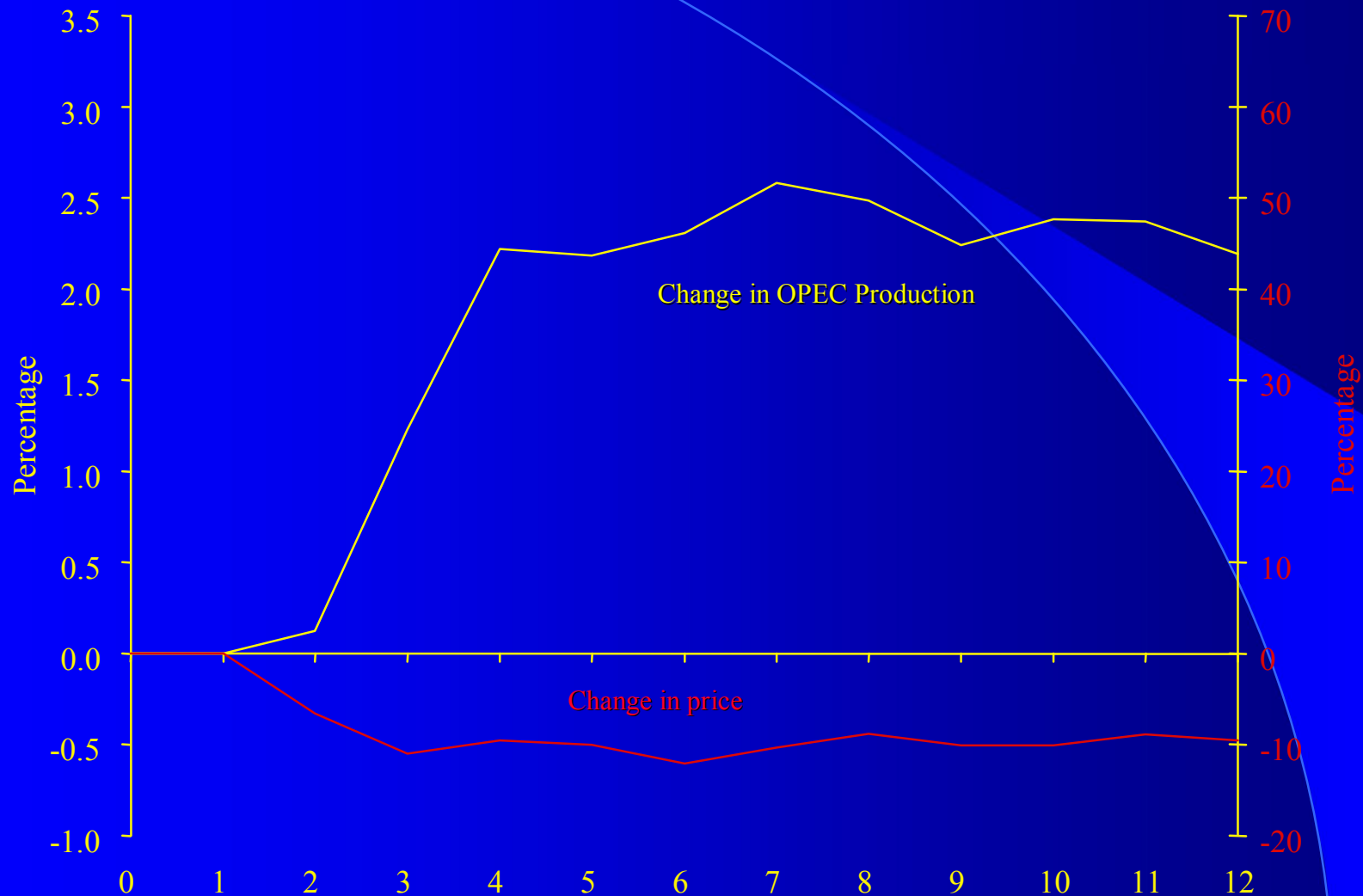
Political & Economic Limits On OPEC Capacity

Multinational firms have the capital needed to increase OPEC capacity significantly, but....

OPEC nations currently prohibit foreign investment in productive capacity, but..

OPEC nations don't have the capital needed to expand capacity significantly

Should OPEC Increase Capacity?

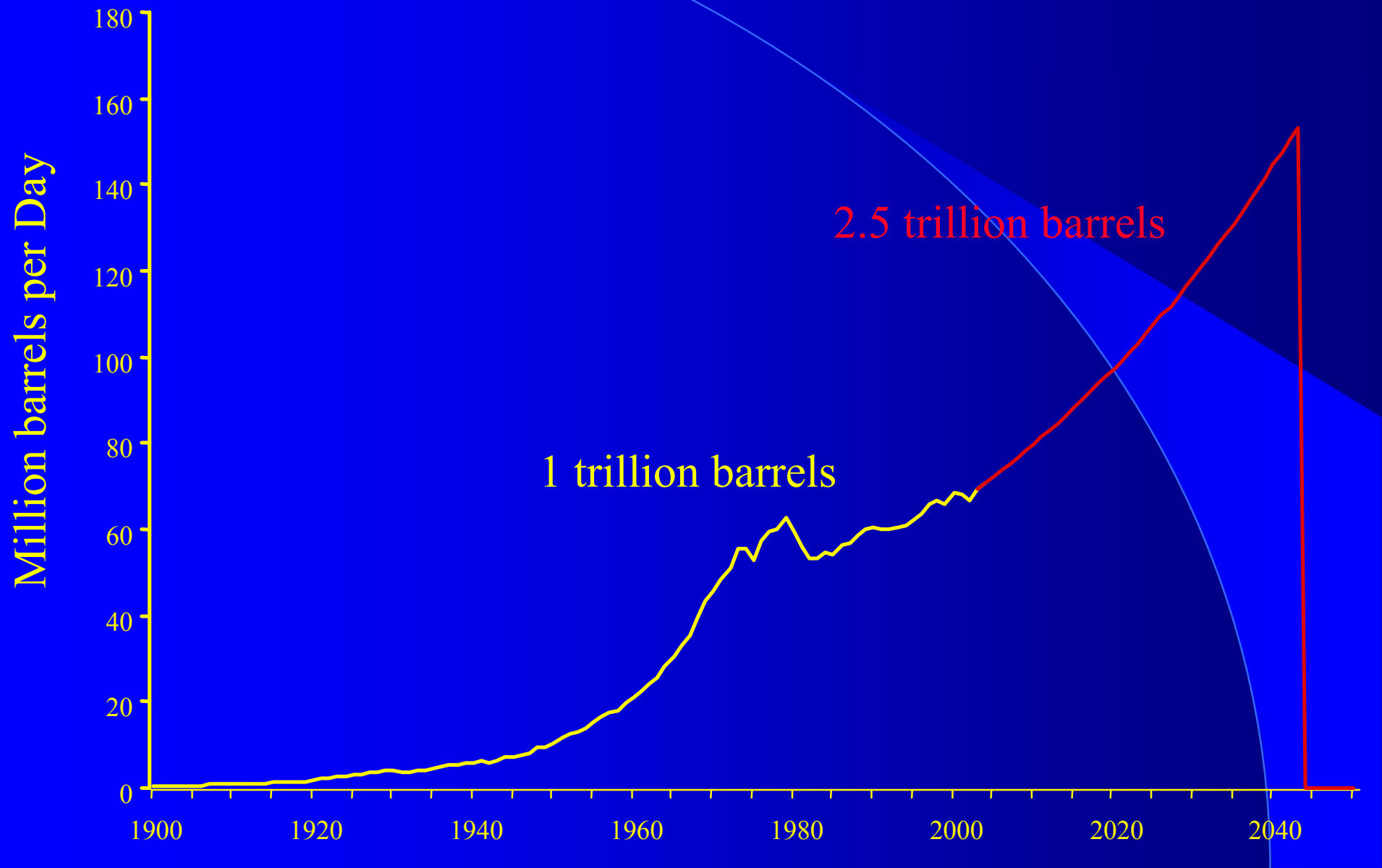


Source: Dees, S, P. Karadeloglou, R.K. Kaufmann, and M. Sanchez, In Press, Modeling the world oil market: assessment of a quarterly econometric model, *Energy Policy*

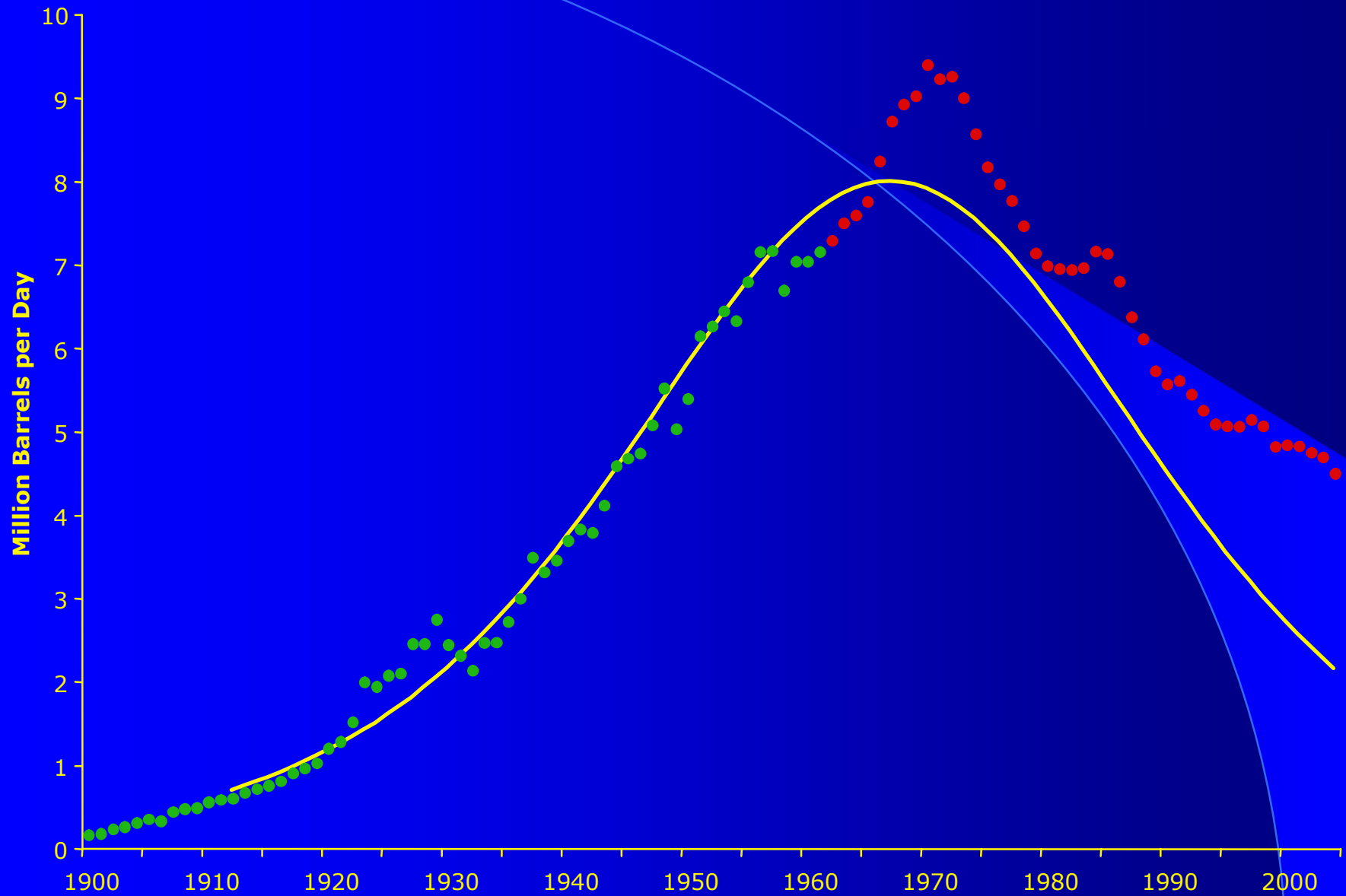
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Is the World Running Out of Oil?

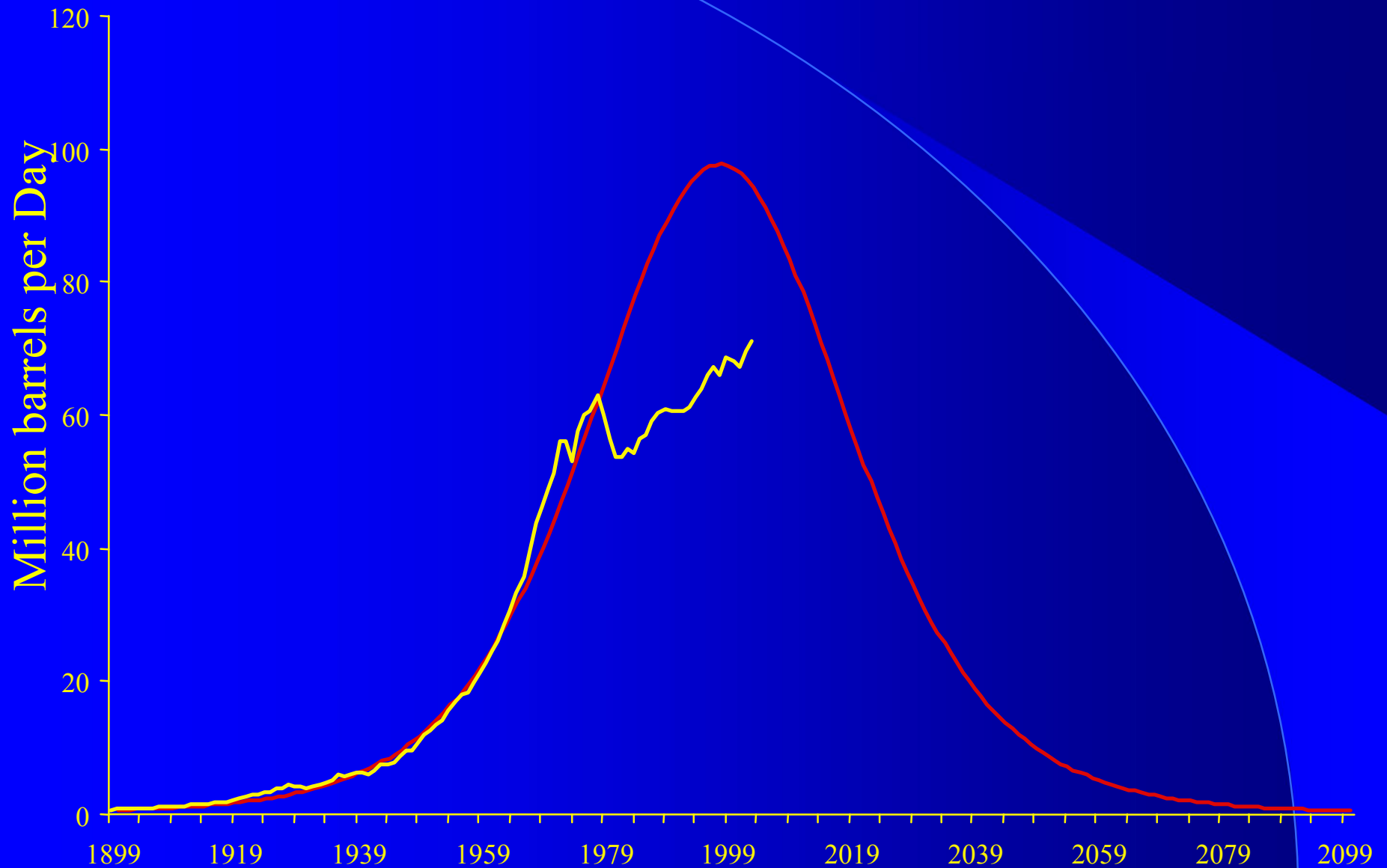
This Will Never Happen...But



Hubbert's Prediction



Hubbert's Forecast for a Global Peak



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Why Can't Hubbert's Bell-Shaped Curve Predict The Future?

Hubbert Was Lucky & Genius

Lucky:

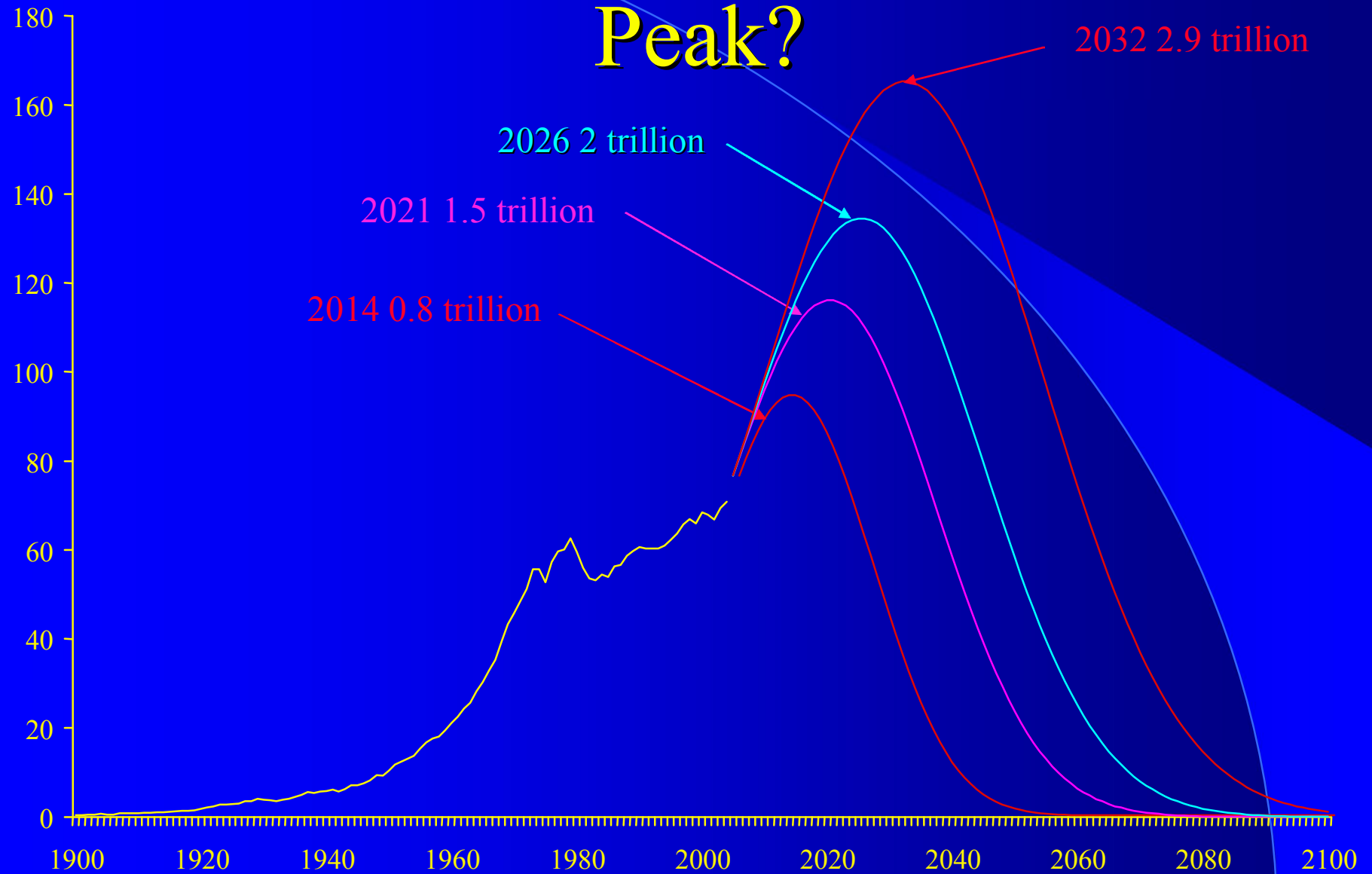
Prices

Prorationing

Genius:

Peak of bell-shaped curve is relatively insensitive to recoverable supply

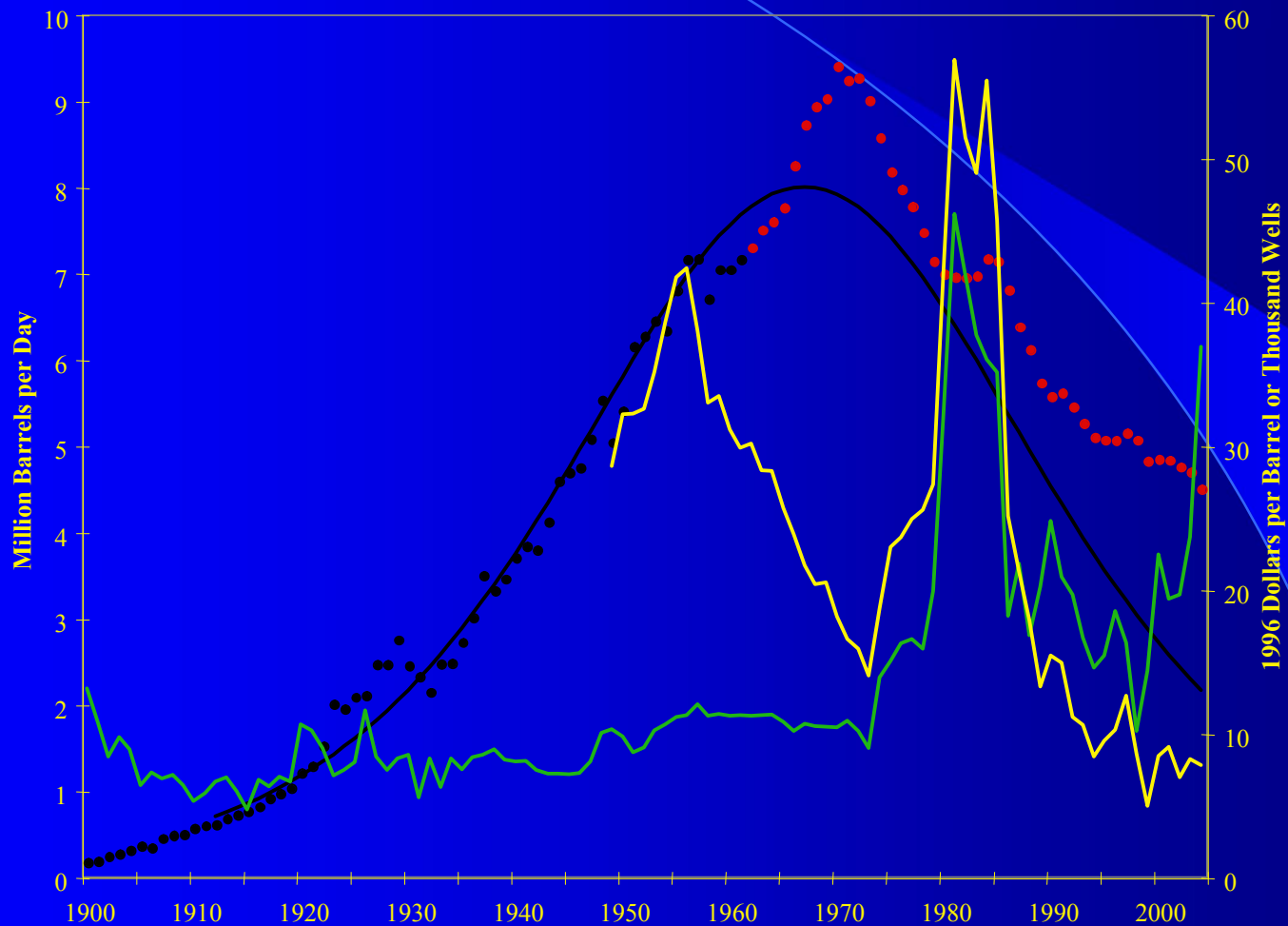
When Will Global Production Peak?



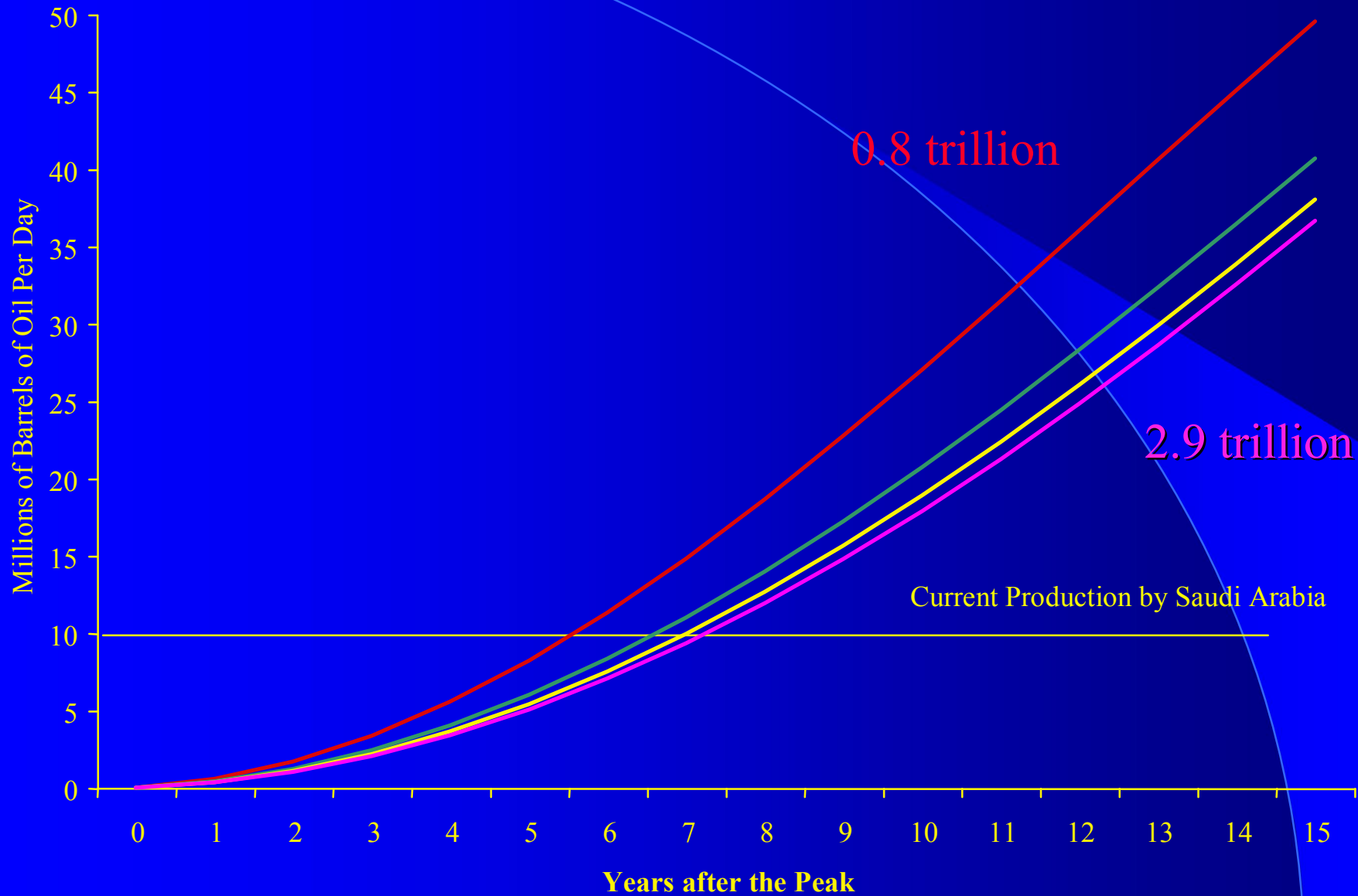
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Does The Peak Matter?

Before and After the Peak



The Need for Alternatives



Producer Investments Under Uncertainty

- If realized peak is earlier than expected peak firm is reaps large profits, but society suffers from lack of alternative supply
- If realized peak is later than expected peak, firm suffers large losses, but society is OK
- Outcomes will favor firms to schedule alternative for post-peak period
- This scheduling implies large short-run disruptions for society

Living Off the Past, Planning For the Future

The oil market has shown a reluctance to make investments in a timely fashion

The lack of timely investments has created the current price spike

Global oil production will peak within 20 years

Timely investments will be critical for this transition